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Spring 2-1-2019

# GEO 211.01: Earth's History and Evolution

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*University of Montana - Missoula*

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## **GEO 211 01, Earth's History and Evolution Spring Semester 2019 Syllabus**

**Lecture:** Monday, Wednesday, and Friday; 11:00 to 11:50 AM; CHCB # 304

**Laboratory:** Tuesday; 11:00 AM to 12:50 PM; CHBC # 348

**Professor:** Marc S. Hendrix; office hours are from 1:00 to 2:00 PM on Monday and Wednesday; other times by appointment. Office is CHCB # 359; phone 243-5278; [marc.hendrix@umontana.edu](mailto:marc.hendrix@umontana.edu)

**Teaching Assistant:** Andrew Keene; Office hours are Tuesday and Thursday 1-2PM. CHCB316; [andrew.keene@umontana.edu](mailto:andrew.keene@umontana.edu)

**Text:** *Earth System History*, 4<sup>th</sup> edition by Stephen M. Stanley and John A. Luczaj, 2015, ISBN 1-4292-5526-9, W.H. Freeman and Company

**Laboratory Manual:** *Interpreting Earth History*, 8<sup>th</sup> edition by Scott Ritter and Morris Peterson, 2015, ISBN 1-4786-1145-6, Waveland Press, Inc.

**Course Outcomes:** The goal is to provide you with a basic understanding of the processes responsible for evolution of the Earth System through time. The course is divided into two parts. The first, which represents about 55-60% of the lecture time, focuses on examining modern Earth processes and developing a basic knowledge of the concepts, methods, and evidence geoscientists use to understand these processes. The second is applying these concepts and methods to examine evidence concerning specific issues related to the evolution of the Earth through time, starting with Earth's formation approximately 4.6 billion years ago and its evolution into the world we know today. During this phase the focus is placed on using process interpretation to decipher changes in ancient tectonic and environmental settings, climate, and biodiversity through time.

**Prerequisites:** There are no prerequisites for this class per se. Basic knowledge of algebra and the introductory principles of physics and chemistry, however, is helpful as are basic computer skills.

**Lecture, attendance, and format:** Attendance is required. Ideas and materials are presented in the lectures that are not covered in the course text. You will be held accountable for all ideas and materials covered in the text and presented in lecture. The format is a traditional lecture with a caveat; the lectures are interactive to an extent. I will ask you questions during the course of lectures in an attempt to verify that you understand/comprehend materials as they are being presented.

**Laboratory attendance:** Attendance is required. Laboratories are interactive and graded. All lab exercises are due at the beginning of Friday morning lecture during the week the exercise is assigned, except for exercises that are two weeks long (#3 and #8) which are due the second Friday at the beginning of class.

**Field Trip:** There is a required Saturday field trip on April 6th. We will leave from the south side of CHCB at 9:00 AM and return by ~ 5:30 PM.

**Article Reports:** Six (6) article reprints from the *American Scientist* (the magazine of Sigma Xi, the Scientific Research Society) are posted on Moodle. You are required to read two (2) of them and write a review/report about the article content and what you learned and new perspectives gained. Each report should be two (2) typed pages, double spaced, with one-inch margins using Times New Roman 12-point font. The first report is due on **February 8** and the second is due on **April 12**. Reports will be assessed based on their content, grammar, and spelling.

**Moodle Supplement:** Lecture PowerPoints and *American Scientist* articles will be posted on Moodle.

### **Lecture, Text, Assigned Reading, and Content:**

#### **Part 1: Materials, Processes, and Principles**

1/11	<i>Earth as a System</i>	Chapter 1
1/14	<i>Minerals and Rocks</i>	Chapter 2
1/16	<i>Diversity of Life</i>	Chapter 3
1/18	continued	
1/21	No Class – MLK Day	
1/23	<i>Environments and Life</i>	Chapter 4
1/25	<i>Sedimentary Environments</i>	Chapter 5
1/28	continued	
<b>1/30</b>	<b>First Exam</b>	
2/6	<i>Correlation and Dating of the Rock Record</i>	Chapter 6
2/8	continued – <b>First article report due</b>	
2/11	<i>Organic Evolution</i>	Chapter 7
2/13	continued	

#### **Part 2: The Story of the Earth**

2/15	<i>Plate Tectonics</i>	Chapter 8
2/18	No Class – Presidents Day	
2/20	<i>Tectonics and Mountain Chains</i>	Chapter 9
2/22	continued	
2/25	<i>Chemical Cycles</i>	Chapter 10
2/27	continued	
<b>3/1</b>	<b>Second Exam</b>	
3/4	<i>The Hadean and Archean</i>	Chapter 11
3/6	continued	
3/8	<i>The Proterozoic</i>	Chapter 12
3/11	continued	

3/13	<i>Early Paleozoic</i>	Chapter 13
3/15	continued	
3/18	<i>Middle Paleozoic</i>	Chapter 14
3/20	continued	
3/22	<i>Late Paleozoic</i>	Chapter 15
3/25 to 3/29	No Class – Spring Break	
4/1	continued	
<b>4/3</b>	<b>Third Exam</b>	
4/5	<i>Early Mesozoic</i>	Chapter 16
4/8	continued	
4/10	<i>The Cretaceous</i>	Chapter 17
4/12	continued – <b>Second article report due</b>	
4/15	<i>The Paleogene</i>	Chapter 18
4/17	continued	
4/19	<i>The Neogene</i>	Chapter 19
4/22	continued	
4/24	<i>The Holocene</i>	Chapter 20
4/26	continued	
<b>5/2</b>	<b>(Thursday) Final Exam, 10:10 AM to 12:10 PM</b>	

**Laboratory Exercises (all on Tuesday 11AM-12:50PM; exercises are due)**

1/15	<i>Relative Dating and Unconformities</i>	Exercise 1
1/22	<i>Analysis of Sedimentary Rocks</i>	Exercise 3
1/29	<i>Analysis of Sedimentary Rocks</i>	Exercise 3
2/5	<i>Fossils and Fossilization</i>	Exercise 8
2/12	<i>Fossils and Fossilization</i>	Exercise 8
2/19	<i>Evidence of Evolution</i>	Exercise 9
2/26	<i>Depositional Environments</i>	Exercise 4
3/5	<i>Stratigraphy</i>	Exercise 5
3/12	<i>Physical Correlation</i>	Exercise 6
3/19	<i>Facies Relationships and Sea-Level ...</i>	Exercise 7
3/26	No Lab – Spring Break	
4/2	<i>Index Fossils and Depositional Sequences</i>	Exercise 12
4/9	<i>Interpretation of Geologic Maps</i>	Exercise 13
4/16	<i>Paleozoic Orogenies of North America</i>	Exercise 15
4/23	<i>Cordilleran Orogeny</i>	Exercise 16

**Course Grade:** Individual exam letter grades and final letter grades will be based on the following percentages of correct responses: 100-90% A, 89-80% B, 79-70% C, 69-60% D, 59% and below F. Plus and minus scores will be assigned to letter grades following university guidelines. **All exams, laboratory exercises, article reports, and the field trip will be counted in determining the final grade in the course.** The weighting to determine the final letter grade is as follows:

% of Final Grade	
24	Laboratory Exercises (12 at 2% each)
06	Field trip (required)
10	Article reports (2 required at 5% each)
12	First exam
12	Second exam
12	Third exam
24	Final exam
100	Total %

**Exams:** All exams except the final exam will be given during the scheduled class period. The days that they occur are marked in **bold face type**. **Midterm exams will be comprehensive, but will focus on the course material covered since the last midterm.** Failure to take a midterm exam at the scheduled time will result in a grade of **zero (0)**, unless prior arrangements are made with the professor or a signed medical excuse from the attending physician is presented to the professor.

**The final exam is comprehensive** from the beginning of the course and the exam period will last for two (2) hours. It is scheduled for **Thursday, May 2, 2018, from 10:10 AM to 12:10 PM**. Failure to take a final exam at the scheduled time will result in a grade of **zero (0)**, unless prior arrangements are made with the professor or a signed medical excuse from the attending physician is presented to the professor.

**Exam questions** types are true or false, fill in the blank, matching, short answer/essay, diagram and graph analysis, and short problem solving.

**LABORATORY EXERCISES:** All laboratory exercises are graded. Each exercise counts at 2% of your final grade. Each exercise must be turned in at the beginning of Friday morning lecture each week to receive credit.

**STUDENT CONDUCT CODE:** Please be familiar with the UM Student Conduct Code. The Student Conduct Code can be found on the Vice President for Student Affairs [website](http://www.umt.edu/student-affairs/dean-of-students/Student%20Conduct%20Code%20-%20FINAL%20-%2008-24-18.pdf) is <http://www.umt.edu/student-affairs/dean-of-students/Student%20Conduct%20Code%20-%20FINAL%20-%2008-24-18.pdf>

**Course Accommodations (DSS):** Students with disabilities will receive reasonable accommodations in this course. To request course modifications, please contact me as soon as possible. I will work with Disability Services in the accommodation process. For more information, visit the Disability Services [website](https://www.umt.edu/dss/) (<https://www.umt.edu/dss/>) or call 406.243.2243 (Voice/Text).